California's Emission Reduction Plan for Ports and International Goods Movement

Alternative Maritime Power Conference
Los Angeles Harbor Hotel
April 24, 2006

California Environmental Protection Agency
Air Resources Board

Emission Reduction Plan Development

- December 2005 draft plan
  - Ports and international goods movement
- March 2006 proposed plan
  - Expanded to include all goods movement
  - Regional analyses added
- Plan approved by Board on April 20, 2006

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Emission Reduction Plan Goals

- Meet federal air quality standards
- Reduce community exposure to toxic air contaminants
- Mitigate anticipated growth in trade and associated emissions
- Identify funding needs

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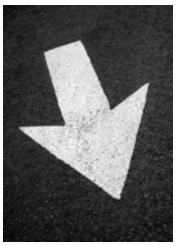
Emission Reduction Plan Features



- By 2010, reduce emissions to 2001 levels
- By 2020, cut diesel PM risk 85%
- Reduce NOx in South Coast 30% in 2015, 50% in 2020
- Apply strategies statewide to aid in attainment

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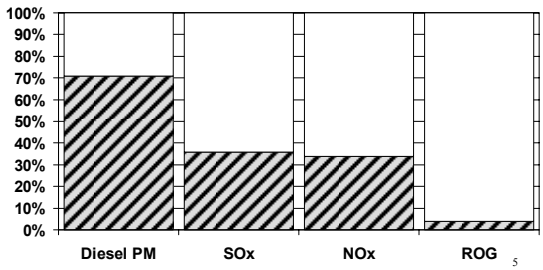
Goods Movement Contribution to Statewide Emissions in 2005



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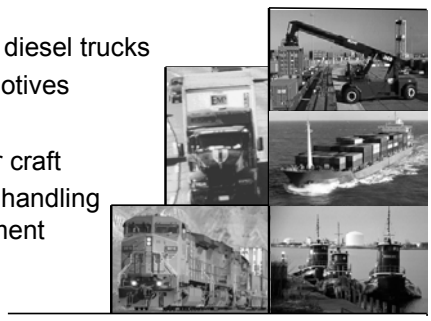
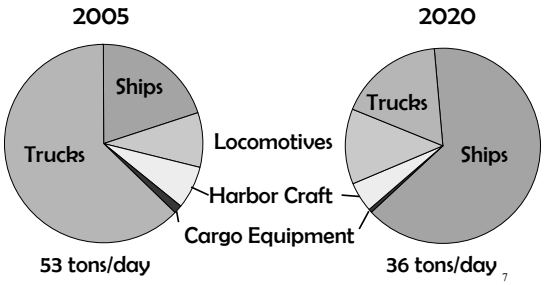
Key Emission Sources from Goods Movement

- Heavy diesel trucks
- Locomotives
- Ships
- Harbor craft
- Cargo handling equipment



Diesel PM from Goods Movement by Emission Source



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Ships at Sea

- Cleaner propulsion engine fuel
- Retrofit controls for existing engines
- Cleaner new ships in California service

	Ship Visits by Year		
	2010	2015	2020
30% Lower Emissions	20%	50%	40%
Best Available Controls	--	25%	50%

Basic Approach of Plan

- Cleaner engines and fuels
- Fleet modernization (retrofit or replace)
- Speed reduction and idling limits
- Shore-based power
- Potential mechanisms include rules, fees/incentives, market concepts, enforceable agreements

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Ships In/Near Port

- ARB rule for cleaner auxiliary engine fuel (Adopted December 2005)
- Strategy to ramp up use of shore power

	Ship Visits by Year		
	2010	2015	2020
Shore Power	20%	60%	80%
Alternate Measures	20%	40%	20%

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Ships New Strategies

- Cleaner new engines and fuels
- Add-on emission controls
- Operational changes
- Shore-based electrical power in port (also called cold ironing)

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Auxiliary Engine Fuel Regulation for Ocean-Going Vessels

- Within 24 nautical miles of coastline
- Requires use of marine gas oil or 0.5% sulfur distillate fuel by January 1, 2007
- Requires use of 0.1% sulfur distillate fuel by January 1, 2010
- Fuel supply review in 2008

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Auxiliary Engine Fuel Regulation (cont.)

- Allows for an Alternative Compliance Plan
  - Encourages use of shore power
- Includes Noncompliance Fee Provision

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ARB's Cold-Ironing Evaluation Report (March 2006)

- Most cost-effective for container, passenger, and refrigerated cargo ships
- Prime candidate ports: LA, Long Beach, Oakland, San Diego, SF, and Hueneme
- 2/3 of capital costs & benefits at LA/Long Beach
- Not cost-effective for ships with irregular or infrequent visits to California
- Will require significant infrastructure investments

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Details of Cost-Effectiveness Analysis

- Estimated ship cost: $500,000 to $1.5 million
- Estimated shore cost: $3.5 million per terminal plus $1.5 million per berth
- Analyzed 0.5% and 0.1% sulfur distillate fuel
- Analyzed all pollutants reduced (NOx, SOx, and PM), NOx-only, PM-only
- Analyzed three scenarios:
  - All ships visiting a port
  - Ships visiting 3 or more times per year
  - Ships visiting 6 or more times per year

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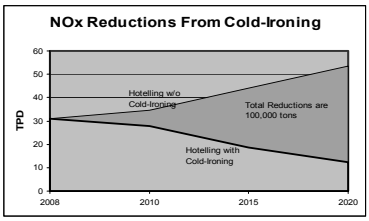
Emission Benefits from Cold-Ironing



- Based on 20%, 60%, and 80% shore power targets

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Harbor Craft New Strategies

- ARB fleet rule for existing engines
- Shore-based electrical power in port
- Tighter U.S. EPA emission standards for new engines (or ARB adoption)

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Cargo Equipment New Strategies

- ARB rule for new and existing equipment (Adopted December 2005)
- 85% PM control on all engines if additional retrofits verified

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Cargo Handling Equipment Regulation (Yard Trucks)

- New equipment must meet performance standards by January 1, 2007
- Repower/replace in-use equipment or retrofit with verified controls starting Dec. 31, 2007
- Most pre-2003 yard trucks replaced by end of 2010

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Other Yard Equipment (Cranes, Top Handlers, Dozers)

- New equipment must meet performance standards by January 1, 2007
- Repower/replace in-use equipment or retrofit with verified controls starting Dec. 31, 2007
- Oldest engines (pre-1998) must comply first
- Longer compliance schedule than for yard trucks due to diversity of equipment

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Trucks New Strategies

- Proposed port truck modernization program
- Developing rule for privately-owned truck fleets
- Enhanced enforcement of truck idling limits in communities
- ARB rule for international trucks (Adopted January 2006)

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ARB's Port Truck Modernization Report (April 2006)

Basic elements in plan

- Incentives to replace oldest trucks and retrofit controls on the rest
- ARB rule to push owners to take advantage of incentives
- Terminals key participants

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Port Truck Modernization Report (cont.)

- Plan would significantly reduce emissions in communities
- Funding and enforcement mechanisms needed

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Rail Yard Locomotives New Strategies

Upgrade switcher/local yard locomotives

- Multiple off-road engines (gen-sets)
- Diesel-electric engines (Green Goats)
- Alternative fuels

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Long-Haul Locomotives New Strategies

- National Tier 3 locomotive standards
  - Should include 90%+ PM/NOx control, rebuild standards, OBD, anti-idling devices
- Tier 3 locomotives use greatly accelerated in California service

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Other Strategies

- Operational efficiency
- Land use decisions
- Project and community specific mitigation
- Port programs

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Benefits of Plan to Public Health

- Avoid 820 annual premature deaths by 2020, reduce other health impacts
- Reduce risk by 85% in impacted communities
- Provide reductions that are necessary to attain air quality standards

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Implementation Strategies

- New Regulations
- Pursue Incentives/Funding Opportunities
- Explore other mechanisms to meet plan goals

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